WASHINGTON HIGHER EDUCATION COORDINATING BOARD

March 2008

Bachelor of Arts in Biochemistry, College of Arts and Sciences, University of Washington

Introduction

The University of Washington (UW) seeks approval to offer a Bachelor of Arts (BA) degree in Biochemistry through the Departments of Chemistry and Biochemistry on the Seattle Campus. In 1989, the department offered for the first time a Bachelor of Science (BS) degree in Biochemistry for students interested in careers in medicine, chemistry, biochemistry, and biotechnology. It was designed as a demanding program for a limited number of students.

Since its inception, the program has grown tremendously with more than 700 declared majors (by headcount) and it has awarded about 150 degrees each year. Students who are interested in careers in the medical or dental professions, bioscience-related law or public policy would benefit from a BA option. It is worth noting that UW offers both a BA and BS option in other fields such as chemistry, physics, and mathematics. Typically, at the UW, it is only small specialized science programs, such as neurobiology, that offer only the BS option. The BA in Biochemistry program distinguishes itself from the BS program in that it:

- Provides a degree option opportunity to students who are interested in biochemistry but seek a broader education than is possible from a BS program, which requires 17 more credits within the major to complete;
- Requires less upper division laboratory coursework than the BS program; and
- Includes a variety of elective courses in related sciences, history, and public policy.

Relationship to Institutional Role and Mission and the Strategic Master Plan for Higher Education

Biochemistry has evolved from a specialized area of study for graduate research to a basic science, akin to biology or physics. The creation of a BA in Biochemistry will broaden access to the biochemistry curriculum and respond to student and industry demand for more flexible degree options. This is consistent with the University's mission, stated as "the preservation, advancement, and dissemination of knowledge."

Program Need

The BS in Biochemistry program has experienced a 45 percent increase in enrollment since 2002, and it is currently many times larger than the anticipated enrollment at the program's inception in 1989. Many students currently enrolled in the Biochemistry BS program and in other programs would benefit from a Biochemistry BA option that may be better-suited to their career goals and educational needs. A Biochemistry BA program may be appropriate for students heading for professional programs in the medical, dental, or nursing fields. Also, students interested in law, journalism, or public policy related to bioscience, may benefit from the BA option. It is not anticipated that the addition of the BA option will significantly increase the number of students in the baccalaureate biochemistry programs, but will instead better serve some students already engaged in the study of biochemistry.

Currently, about one-third of Biochemistry BS students goes on to graduate school, one-third goes to medical or dental professional school, and one-third goes directly to industry. The Biochemistry BA program will primarily serve those headed to professional schools, and to a lesser extent, those headed directly to industry. Graduates may be qualified for jobs in less technical positions in the bioscience/biotechnology industry, which continues to grow in our state. The BA degree will be a more generalist program of study that can be more easily combined with a minor or double major in another field. Many peer public research universities offer both a BA and BS in biochemistry.

Alignment with the Strategic Master Plan

The creation of the BA program will enhance the efficiency of time to degree for some students, as it requires fewer credits than the BS option to complete. At current participation rates, a take up rate of 20 percent in the BA program will yield a total of about 300 fewer credits to graduate than would otherwise be required if those students had selected the BS option. Because the time to degree may be reduced, the rate of program completion may also rise. By providing students with a solid science background in a generalist curriculum, the program addresses an economic need by providing research enterprises with workers who can translate science into ideas and products that people understand and can embrace.

No other public institution in the state offers a BA in Biochemistry, but several offer a BS degree (WSU, Eastern, Western, and Central Washington Universities). Several peer public research institutions with large biochemistry programs like UW's offer a BA in Biochemistry, the University of Texas at Austin and the University of Arizona among them.

Program Description

The program requires 90-92 credits of required core courses combined with 90 required credits of coursework outside the major by the College of Arts and Sciences for a total of 180 credits to earn the BA in Biochemistry degree. Required coursework includes courses in math, general and organic chemistry, biology, physics, biochemistry, physical chemistry, an additional nine credits of electives from a prescribed list, and up to three credits of advanced undergraduate research.

The major differences between the Biochemistry BS and BA programs do not appear until the senior year, so preparation in the freshman and sophomore years would be the same. Both programs are open majors, so transfer students who enroll at UW are free to declare either program as their major. There is no Major Ready Program established for biochemistry, but the upper division required courses have pre-requisites that a transfer student would need to consider in putting together their lower division course schedule. Students interested in transferring into biochemistry as a major at the UW would be well advised to pursue the Associate of Science transfer pathway.

Diversity

The Department participates in UW and College of Arts and Sciences initiatives to enroll more underrepresented minorities and women in science programs. The program will participate in these efforts also. No specific department-sponsored or College initiatives were indicated in the proposal.

External Review

External reviews were conducted by Professor Spencer Anthony-Cahill with the Western Washington University Department of Chemistry, and by Kevin Ahern, Ph.D., in the Department of Biochemistry and Biophysics at Oregon State University. Both reviews were positive and supported the program as well justified and necessary. Citing specific language in the proposal, Dr. Ahern warned against using the program as "a place to dump lower-performing students" or creating a "dumbed down" BS degree. He noted the importance of boosting academic advising efforts to ensure that each student gets into the right program from the start, rather than simply creating an outlet if they later fail. He also noted that the creation of the program might in fact lead to an increase in the number of students interested in biochemistry and completing degrees (not simply shifting students over from the BS program), and the department needs to be prepared for that eventuality, should it arise.

In a response to Dr. Ahern's observations UW Professor of Chemistry Phillip Reid agreed that it is not the intention of the Department to create a "fallback degree" and acknowledged the importance of timely and effective academic advising. Dr. Reid also stated that they will closely monitor enrollment growth and make sure they can effectively support any growth of enrollment

once the program in initiated. The Department hopes to keep both biochemistry programs as "open majors" without any caps, but may need to reconsider this policy if student interest exceeds available institutional resources.

Program Costs

There are no additional costs incurred by the Department to offer this degree option. No new faculty will be hired nor will courses be created or offered that are not currently available. The Department estimates that about 7 percent of the current faculty budget will be allocated to support the program. In all, costs will rise to $818,000 annually or $13,636 per FTE student. The plan is to ramp up over three years to a 60 FTE (60 headcount) enrollment level, graduating 25 students annually, beginning in Year Five.

Staff Analysis

The University of Washington has made a strong case for need of this program from the student, employer, and community perspectives. Establishing a BA in Biochemistry program would also be consistent with pattern and practice in other UW science departments and at other biochemistry departments at peer institutions. It would be the only BA in Biochemistry program at a public institution in the state.

In creating a more generalist degree, this program would be a degree option that may have more appeal to groups of students who traditionally have not shown a high level of interest in pursuing careers in the sciences, particularly female students and students of color. According to IPEDS data for 2005-06, while the current BS program awards degrees to a majority female population, 84 percent of biochemistry degree recipients are non-Hispanic, White, or Asian American. In that year, degrees were awarded to just one black student, two American Indian/Alaskan Native students, and four Hispanic students (5 percent of the total number of degrees awarded that year). Furthermore, according to a 2006 UW report, only 8 percent of tenured and tenure track faculty in the chemistry department are female, the lowest percentage among science departments in the College of Arts and Sciences. This is especially striking when viewed against recent data showing that the percentage of female students receiving doctorates in chemistry has risen to 34 percent, making it possible to recruit female professors.

Given this data, there appears to be an opportunity with the creation of this program for the department to make special efforts to broaden its appeal beyond the White and Asian American groups it currently serves, and make headway on increasing the diversity of tenured and tenure track faculty so that it more closely matches the majority female students sitting in the classes.

Recommendation

Based on careful review of the program proposal and supplemental communications, HECB staff recommends approval of the BA in Biochemistry program at the University of Washington.

The Education Committee met on March 3, 2008 to review this proposal. The Committee reviewed and discussed the *Department of Chemistry Diversity Plan*, which was submitted to the Committee just prior to the meeting. The Education Committee learned that the chemistry department is aware of, and has a plan to address the diversity issues raised above and is dedicated to increasing student and faculty diversity and providing support to under-represented student groups. Overall, the Education Committee was satisfied with the University's response to the issues and the HECB will continue to monitor the department's progress in achieving its diversity goals.

The Education Committee voted unanimously to recommend approval of the proposed program.

RESOLUTION NO. 08-05

WHEREAS, The University of Washington proposes to offer a Bachelor of Arts in Biochemistry to complement its existing Bachelor of Science in Biochemistry program; and

WHEREAS, The program would support the unique role and mission of the institution by providing students with an opportunity to pursue a broader educational plan focusing on biochemistry that can more easily be combined with study in other disciplines; and

WHEREAS, The program would respond to demonstrated student, employer, and community needs, consistent with past experience with this program and the university's assessment of need; and

WHEREAS, The program would expand the education options for students interested in careers related to bioscience and biotechnology;

THEREFORE, BE IT RESOLVED, That the Higher Education Coordinating Board approves the Bachelor of Arts in Biochemistry at the University of Washington.

Adopted:

March 19, 2008

Attest:

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Bill Grinstein, Chair

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Roberta Greene, Secretary